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March 29, 2004

Commissioner for Patents  
Patent and Trademark Office  
P.O. Box 1450  
Alexandria  
VA 22313-1450  
United States of America

Re: Application number 10/086,220  
Filing Date: 02/28/2002  
Name of Applicant: Tom Kusic  
Invention Title: Tandem Powered Power Tilting  
Aircraft

Attention: Mr. Stephen A. Holzen

Thank you for your report with the mailing date 02/24/2004  
in respect of patent application number 10/086,220.

In response to point 4 on page 2 of your report, attached is  
an information disclosure statement listing the patents that I  
referred to in my response dated December 23, 2003.

In response to the rejection of claim 4 as being unpatentable  
over Serriades (3,282,534) in view of Brady (3,985,320) and  
Perrin (1,491,310):

The aircraft presented by Serriades in Figures 1 and 2 shows two forward tilttable jet engines at the forward part of the main body of the aircraft, and two forward tilttable jet engines at the rear part of the main body of the aircraft. The two jet engines at the forward part of the main body are connected to the main body by means of a wing, which wing is rigidly attached to the main body of the aircraft and is not tilttable. The two jet engines at the rear part of the main body are connected to the main body by means of another wing, which wing is also rigidly attached to the main body and is not tilttable. The jet engines are connected to the ends of their respective wings, and are connected to the wings so that each jet engine can be pivotally rotated relative to the respective wing to which each jet engine is connected. That is, the jet engines can only be tilted in a forward and rearward direction relative to the main body of the aircraft. The jet engines cannot be tilted in a lateral direction relative to the main body of the aircraft. Serriades makes reference to the wings and that the jet engines are pivotally connected to the wings on page 2, lines 41 to 52.

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(Re: Application number 10/086,220 continued)

With respect to Brady, Figure 1 in Brady shows two vertically positioned rotors, and each rotor is fitted with a propeller. Both propellers shown in Figure 1 are horizontal. In front of each rotor is a hydraulic actuator. There is nothing to suggest in Figure 1 that the hydraulic actuators can be operated independently of each other. The positioning of the hydraulic actuators indicates that the action of the hydraulic actuators is intended to cause forward tilting for forward flight once vertical take off has been achieved. With the hydraulic actuators positioned as they are in Figure 1, opposite tilting of the rotors could result in only two possible outcomes:

- 1/ The forward propeller (25) is tilted rearward while the rear propeller 27 is tilted forward; or
- 2/ The forward propeller (25) is tilted forward while rear propeller is tilted rearward.

In each case the opposite tilting would reduce the combined lifting efficiency of the propellers without providing any potential for greater forward or rearward movement of the aircraft than could be achieved by tilting the rotors in the same forward or rearward direction. The effect of opposite tilting of rotors where the forward propeller is tilted rearward (outcome 1/) is to create a bending stress on the main body of the aircraft. The effect of opposite tilting of rotors where the forward propeller is tilted forward (outcome 2/) is to create a stretching stress on the main body of the aircraft.

The only opposite tilting of the rotors that would have made sense is in lateral directions - but the hydraulic actuators are not positioned for lateral tilting. Clearly, opposite tilting of the rotors was never the intention of Brady, in view of the position of the hydraulic actuators in Figure 1.

After receiving your detailed action report with the mailing date 02/24/2004 I decided to read Perrin's specification thoroughly. However, during my reading of Perrin, I could not find any statement saying that the rotors can be tilted laterally in opposite directions to one another, in a controlled manner.

In response to point number 5 in your report, the narrative is essentially a quote from claim 4 of my application. Lines 13 to 17 of page 5 of your report state that in Perrin the primary and secondary lifting mechanisms can be tilted in opposite directions, in a controlled manner. However, Perrin does not make any mention of opposite tilting of rotors in lateral directions.

(Re: Application number 10/086,220 continued)

And with respect to jet engines and rotors with blades that merely force air being art equivalents, if the rotors and rotating blades in Perrin were removed and replaced with jet engines, the aircraft could not achieve flight since the jet engines would simply be forcing hot exhaust gases at the main body of the aircraft.

In horizontal flight, the two forms of propulsion might be viewable as art equivalents, since controls such as ailerons can be used irrespective of the type of propulsion. But controlled vertical take-off and landing, combined with an ability for horizontal flight involves more complexity, and consideration has to be given to the positions that jet engines can be placed in to be effective for vertical take-off and horizontal flight. Control has to be maintained during vertical take-off as well as during forward flight. During the mid to late 1950's research was conducted in an effort to conceive an aircraft that could function effectively as a fighter, but which could also take-off and land vertically. Two aircraft with propellers were conceived, the Convair XFY-1, and the Lockheed XFV-1. Both of these aircraft rested on their respective tail sections prior to vertical take-off. Air was forced in a downward direction by the propellers of each aircraft. They were in effect conventional type aircraft tilted onto their tail sections. When this was attempted with an aircraft using only a jet engine, the Ryan X-13, it was clear that such an aircraft couldn't simply rest on its tail section, since the hot exhaust gases from the jet engine would not be able to exit freely. In order to allow the hot exhaust gases from the jet engine to escape, the aircraft had to be suspended above the ground by a hook. A special platform had to be constructed that was strong enough to support the jet aircraft. The aircraft could take-off vertically only from the hooked position, and land vertically by being re-hooked to the platform. What this demonstrates is that the different propulsion systems have significant differences in performance characteristics in the field of vertical take-off and land, with transition to horizontal flight, such that the propulsion systems discussed cannot be viewed as art equivalents in the field of vertical take-off and land, combined with an ability for transition to horizontal flight, and this could explain why aircraft with jet engines that are tilttable in lateral directions have not been constructed or patented, whereas aircraft with forward and rearward tilting jet engines have been constructed and patented. The tilting of a jet engine laterally relative to the main body of an aircraft is a new concept, which can be so effective in providing control over an aircraft as well as forward propulsion that the question arises as to why aircraft have not already been constructed with this concept.

Yours sincerely,



T. Kusic

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